

Snapping Turtle Habitats Potentially Impacted by USACE Reservoir Operations

BACKGROUND: Changing water levels or other operations at U.S. Army Corps of Engineers (USACE) reservoirs may impact critical habitat parameters for snapping turtle species. This technical note identifies snapping turtle species and habitats potentially impacted by USACE reservoir or other water-control projects as reported by resource managers (Table 1). Current state and/or Federal legal protection status as well as the distribution of USACE Districts and reservoir projects potentially impacted by snapping turtle conservation issues are summarized (Figure 1, Table 2). Life-history summaries and habitat requirement descriptions are given for the snapping turtle species identified as potentially impacted at reservoir operations. This group includes only two species; the alligator snapping turtle and common snapping turtles. Alligator snapping turtles are Federal candidates for protection and common snapping turtles are listed as either state species of special concern or carry harvesting regulations in 15 states. Environ-



Common Snapping Turtle
photo by Dena Dickerson



Alligator Snapping Turtle
photo by Dena Dickerson

mental issues associated with these turtles were reported by 25 USACE projects from 3 USACE Districts (3 USACE Divisions).

Distribution of the alligator snapping turtle is restricted to U.S. river systems that drain into the Gulf of Mexico, whereas the common snapping turtle range extends throughout the United States east of the Rocky Mountains (Figure 2). Both species prefer benthic living and foraging and are opportunistic omnivorous scavengers. Alligator snapping turtles most frequently occur in the deep water of rivers, canals, and lakes (Figure 3).

Snapping Turtles Potentially Impacted by Reservoir Operations		
Turtle Common Name	Scientific Name	Protection Status
Alligator snapping	<i>Macroclmys temminckii</i>	Federal candidate for protection
Common snapping	<i>Chelydra serpentina</i>	State possession/harvesting regulations

Common snapping turtles can be found in almost every kind of freshwater habitat. Although biological data on alligator snapping turtles are severely lacking, reports of population declines have been attributed to commercial harvesting for food and the pet trade. Common snapping turtles are among the more abundant aquatic turtles; however, overcollecting has seriously reduced many populations.

Table 1 Summary of Survey Results, Snapping Turtles						
Species	Protection Status		Divisions Identified	Districts Identified	Number	
	State	Federal			District	Total
Alligator snapping turtle	State protected	Federal candidate for protection	SWD MVD	Little Rock Rock Island	24 ?	24
Common snapping turtle	Possession/ harvesting regulations		LRD	Pittsburgh	1	1
Summary			SWD MVD LRD	Little Rock Rock Island Pittsburgh	24 ? 1	25

? Questions remain about survey response

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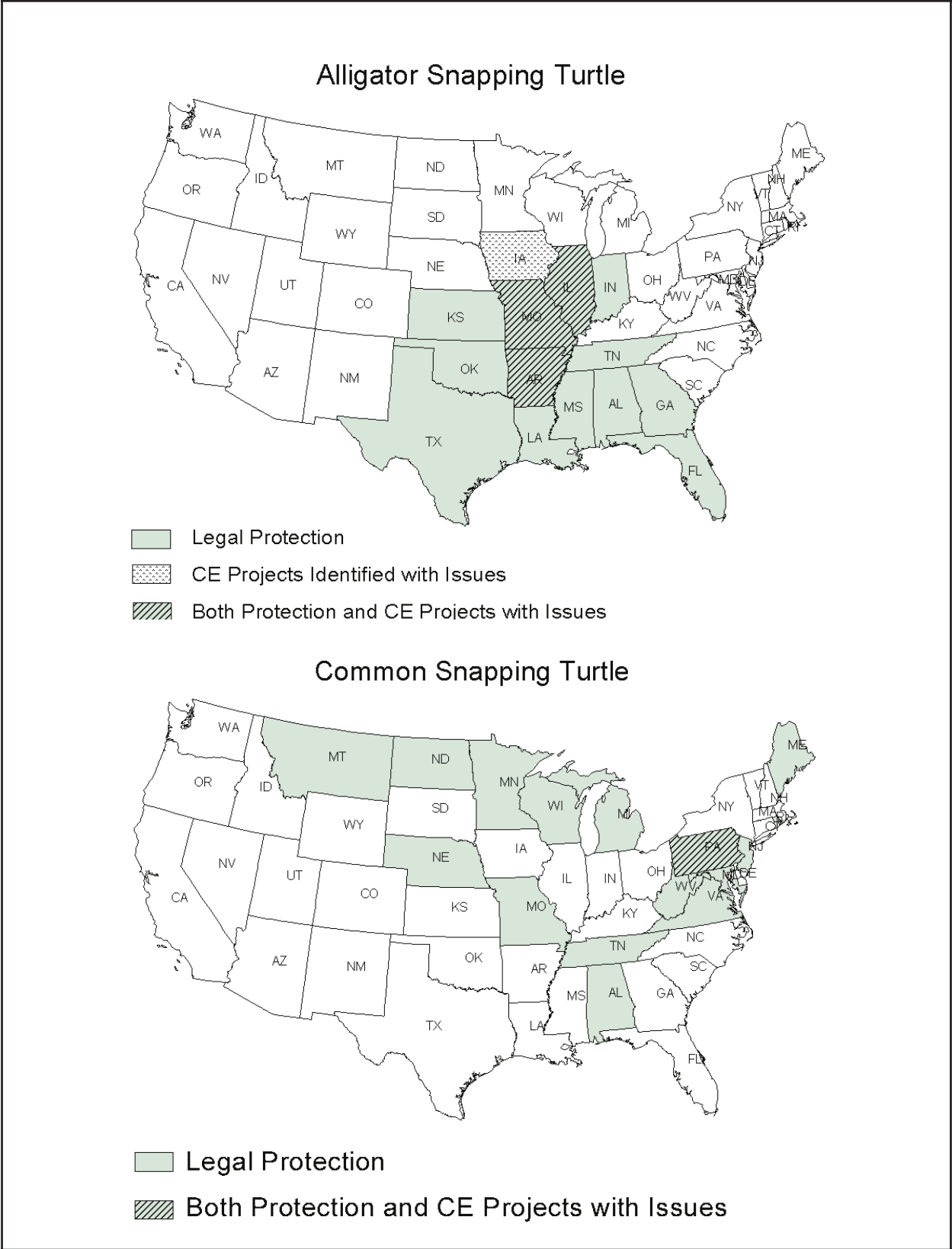


Figure 1. Legal protection status



Figure 2. Alligator snapping turtle habitat range



Figure 3. Common snapping turtle habitat range

Table 2
Turtle Protection Status by Species

Turtle Species	North Atlantic States												South Atlantic States			
	ME 1/95	NH 1/98	VT 3/98	MA 11/97	CT 95	RI 95	NY 2/97	PA 1/94	NJ 6/96	DE 3/97	MD 11/94	VA 5/92	NC 9/94	SC 1/98	GA 10/97	FL 8/97
Alligator snapping	FC														t	SSC
Common snapping		PHR				PHR		PHR	PHR	PHR	PHR	PHR				

	Midwest States								Southwest States					Pacific States				
	ID 9/97	MT 3/97	WY 1/97	CO 7/95	KS 6/93	NE 5/94	ND 97	SD 3/96	NM 12/97	AZ 1/97	NV 5/94	UT 3/97	CA 3/97	OR 12/96	WA 7/93	HI 1/97	AK 9/93	
Turtle Species																		
Alligator snapping	FC				SSC													
Common snapping		SSC				PHR	PHR											

Turtle Species	North Central States										Gulf States							
	KY 11/97	MO 6/97	IA 1/98	MN 7/96	WI 12/97	IL 4/97	IN 94	OH 9/97	MI 6/94	WV 1/97	TX 11/97	LA 1/97	MS 6/96	AL 11/97	OK 4/93	AR 6/96	TN 9/94	
Alligator snapping FC		SSC				E	T				T	PHR	SSC	SSC	PHR	SSC	SSC	
Common snapping		PHR		SSC	PHR				PHR	PHR				PHR			PHR	

FT Federally threatened
 FC Candidate for Federal protection
 SSC State species of special concern
 T or ST State threatened
 E or SE State endangered
 PHR Possession and/or harvesting regulations
 Shading Indicates species with potential issues at CE Reservoirs

Profile: Alligator snapping turtle (*Macrolemys temminckii*)

Distribution: The alligator snapping turtle is confined to river systems in the United States that drain into the Gulf of Mexico. The species is widely distributed in the Mississippi Valley from Kansas (Clarke 1981), Illinois (Morris and Sweet 1985), and Indiana (Grannan and Anderson 1992), to the Gulf, and has been reported from almost all river system in the Suwannee River in Florida (Iverson and Etchberger 1989) to the San Antonio River in Texas (Iverson 1992).

Habitat: The alligator snapping turtle most frequently occurs in the deep water of rivers, canals, lakes, oxbows, and sloughs; but it is also found in swamps and marshes near running water and occasionally in the brackish water of the coastal plain (Ernst and Barbour 1989). The preferred living and foraging habitat of alligator snappers is stream bottoms with mud substrate and abundant aquatic vegetation, but they have also been found in sand substrate without aquatic vegetation (Soule 1992). Sloan and Taylor (1987) reported that alligator snappers in northeast Louisiana preferred floatant (dense floating vegetation mat) with cypress (*Taxodium distichum*) or buttonbush (*Cephalanthus occidentalis*). Juveniles may be found in small streams.

Behavior: Information about the behavior of alligator snappers under natural conditions is insufficient. What information is known has been acquired primarily from captives. Adults are highly aquatic; typically only nesting females venture onto land. Alligator snapping turtles seldom if ever bask (Pritchard 1989). The snapper walks along the stream bottom and seldom swims. This turtle is highly secretive, hiding during daylight hours and becoming active at night. Unlike other aquatic turtles, alligator snappers cannot remain submerged for long periods of time (average 40-50 min) (Ernst et al. 1994). Considered an ambush predator, the alligator snapping turtle entices fish within striking distance by its pseudo-annelid lure, located on the floor of its mouth. Tracking studies indicate homing and territorial behaviors as well as daily and seasonal movement patterns (Harrell et al. 1996).

Reproduction: Mating has been observed with captive specimens during February, March, and April in Florida (Allen and Neil 1950), and in Oklahoma during October (Grimple 1987). No evidence exists that *Macrolemys* lays more than one clutch per season. Allen and Neill (1950) reported clutch sizes ranging from 9 to 44 eggs. Eggs are laid in April, May, June, and July, depending on location. Nesting is diurnal. Nests are dug with the hind limbs and eggs are laid in sand or sand mixed with silt and organic alluvium usually adjacent to streams or rivers. Nests are frequently found on the overgrown ends of sandbars. Ewert (1976) noted a conspicuous absence of nests on open sandbars and in low forested areas with leaf litters and matted roots. The tail and hind limbs are used to cover and pack the nest. Incubation ranges from 79 to 107 days, with variability due to mean temperature. Possible hatchling overwintering occurs in the nest. Gender determination is temperature-dependent.

Food habits: Alligator snapping turtles are opportunistic scavengers that consume a variety of prey with fish representing a large portion of their diet (Pritchard 1989). Diet may also consist of crayfish, crabs, freshwater mussels, snakes, small alligators, salamanders, fruit (tupelo, palmetto), and aquatic grasses. In addition, other turtles such as *Graptemys*, *Trachemys*, *Pseudemys*, *Sternotherus*, *Macrolemys*, and *Trionyx* are known to be prey (Shipman et al. 1991).

Populations: George (1987) and Pritchard (1989) reviewed anecdotal information from trappers and state wildlife biologists and concluded that a substantial decline in this species has occurred throughout its range. Decline in Louisiana has been attributed to commercial harvesting.

Remarks: *Protection Status:* Federal: Federal candidate for protection; Endangered: Indiana; Threatened: Georgia, Illinois, Texas; State species of special concern: Florida, Kansas, Montana, Mississippi, Alabama, Arkansas and Tennessee; Possession and/or harvesting regulations: Louisiana and Oklahoma.

Profile: Common snapping turtle (*Chelydra serpentina*)

Distribution: The range of the common snapping turtle extends from Nova Scotia, New Brunswick, and southern Quebec west to southeastern Alberta, and southward east of the Rocky Mountains to southern Florida and the Texas coast in the United States.

Habitat: Typically found in almost every kind of freshwater habitat, but prefers slow-moving water with a soft mud or sand bottom and abundant aquatic vegetation. Generally lives in shallow bodies of water, but may live along the edges of deep lakes and rivers. Florida snapping turtles are frequently found in canals, sloughs, and pools and can be found in acidic, muck-bottom hammock streams. The snapping turtle may also enter brackish coastal waterways (Kiviat 1980).

Behavior: *Chelydra* usually moves slowly over the bottom; however, if disturbed it can swim rapidly. It usually spends the bulk of the day floating just beneath the surface, lying on the bottom of a deep pool, or buried in the mud in shallow water. A social relationship with *Chrysemys picta* (painted turtles) basking on the back of a floating snapping turtle has been described by Legler (1956). In the southern range, the turtle may be active year round. In the northern range, hibernation begins by late October; however, radiotelemetry studies indicate not all snapping turtles hibernate (Ultsch and Lee 1983). Burrowing in mud bottoms, or using muskrat burrows or lodges is the typical overwintering preference. Large congregations sometimes hibernate together (Meeks and Ultsch 1990). Emergence from hibernation usually occurs in April or as late as May in Canada. While basking can occur out of water, it occurs most frequently in the water with the turtle floating on the surface with just the head and top of the carapace exposed. Aerial basking is restricted by the animal's intolerance of high temperatures and by rapid loss of moisture. Hatchlings are attracted to large areas of intense illumination, which allows them to find their way from the nest to the water.

Reproduction: Mating occurs from April to November with peak nesting from 15 May to 15 June; however, nesting may occur prior to this in the south or afterwards in the north (Ewert 1976). Nesting in Canada may not begin until mid-June, with the season extending into July (Robinson and Bider 1988). The nesting cycle is bimodal (morning and evening) over most of its range, (e.g. New York, Michigan); however, this is not true for all locations (e.g. Virginia, mostly morning nesting) (Petokas and Alexander 1980). Nests are dug with the hind feet in an open site in relatively loose sand, loam, vegetable debris, or sawdust piles. Muskrat and beaver lodges are sometimes used, as well as manmade sites such as roadsides, railways, and dams. Clutch size is variable, ranging from 6 to 104 (typical range: 20-40). Incubation time, longest in the northern region, ranges from 55 to 125 days, but 75 to 95 days is more typical (Congdon et al. 1987). Emergence from the nest normally occurs from mid-August to early October, but may be earlier in the southern range or delayed until the following spring (southeastern Pennsylvania; Ernst (1966)). More northern populations in the United States and Canada have very low frequencies of overwintering in the nest by hatchlings (Obbard and Brooks 1981). Gender determination is temperature-dependent.

Food habits: Common snapping turtles are omnivorous, eating almost anything to include insects, spiders, isopods, amphipods, crayfish, fiddler crabs, shrimp, clams, snails, earthworms, leeches, freshwater sponges, frogs and toads, salamanders, small turtles, snakes, fish, aquatic or semiaquatic birds, plant material, and small mammals. The snapping turtle is considered a nuisance since it consumes game fish and ducklings (Abel 1992).

Populations: Even though snapping turtles are among the more abundant aquatic turtles, overcollecting has seriously reduced many populations (Ernst et al. 1994). Studies have shown sex ratios within a population are typically 1:1 and this ratio is maintained throughout adulthood (Mosimann and Bider 1960). After emergence from the nest, hatchlings and juvenile size and age classes may predominate in the population; however, this is short-lived due to their high mortality. Chemical pollution is linked to population decline (Ryan et al. 1986).

Remarks: *Protection Status:* State species of special concern: Minnesota, Montana; Possession and/or harvesting regulations: Montana, Wisconsin, Michigan, West Virginia, Alabama, Tennessee, Nebraska, North Dakota, Rhode Island, Pennsylvania, New Jersey, Delaware, Maryland, Virginia.

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